

BP
determining a ratio of the first transverse cross-sectional area over the first area; and forming within the passage a transition portion when the ratio of the first transverse cross-sectional area over the first area exceeds a predetermined value, the transition portion being interposed between the orifice portion and the sealing portion and having a third transverse cross-sectional area relative to the axis that decreases at a second rate in the downstream direction from the second area to the first transverse cross-sectional area, wherein the forming of the sealing portion includes grinding with a tool that has a conical end with a vertex of the conical end disposed in the transition portion to provide a select finish on the sealing portion, the transition portion provides a volume receiving the vertex of the tool so that the vertex avoids contact with the sealing surface and with the transition portion, the vertex being proximate to the axis of rotation.

concluded

REMARKS

The Office Action issued 19 September 2001 and the Advisory Action issued 7 January 2002 have been reviewed and the comments of the U.S. Patent and Trademark Office have been considered. Claim 7 has been amended, and claims 2-4 and 6-10 remain pending. Accordingly, Applicant requests reconsideration of these pending claims.

Claims 2-4 and 6-10 stand rejected under 35 U.S.C. §103(a) as being unpatentable over either JP 60-019957 (Yuji) or GB 2 029 508 (Claxton), in view of GB 2 151 516 (Sasao). These rejections are respectfully traversed for at least the following reasons: 1) there is no teaching or suggestion in the applied prior art of Applicant's claimed combinations of features; and 2) the Office Action impermissibly relies on Applicant's specification to suggest modifying the applied prior art.

First, Independent claim 7 recites a combination of features including forming a sealing portion by "grinding with a tool that has a conical end with a vertex of the conical end disposed in the transition portion to provide a select finish on the sealing portion, the transition portion provides a volume receiving the vertex of the tool so that the vertex avoids contact with the sealing surface and with the transition portion, the vertex being proximate to the axis of rotation." Support for these features may be found in Applicant's specification at page 9, lines 10-14, and at page 12, lines 6-13. Specifically, with reference to Applicant's Figure 2, the

transition portion 614 provides a volume that receives the tip, i.e., vertex, of the grinding tool forming the needle sealing portion 612. Thus, the transition portion 614 provides a volume receiving the vertex of the grinding tool so that the vertex avoids contact with the sealing surface 612 and with the transition portion 614.

The Office Action states that neither Yuji nor Claxton “disclose using a grinding tool having a conical end with a vertex of the conical end disposed in the transition portion.” The Office Action purports to address the deficiencies of Yuji and Claxton by relying on Sasao, which allegedly suggests finishing the surface of a sealing portion “using a grinding tool having a conical end with a vertex” so that “the finishing accuracy can be improved.” We disagree.

Sasao uses a second burnishing surface 17b of a burnishing tool 17 “to form a seat surface 10a” (Sasao page 2, lines 93-98). Sasao fails to teach or suggest a transition portion that is distinct from Sasao’s seat surface 10a. In particular, Sasao fails to teach or suggest a transition portion “being interposed between the orifice portion and the sealing portion and having a third transverse cross-sectional area relative to the axis that decreases at a second rate in the downstream direction from the second area to the first transverse cross-sectional area,” as recited in Applicant’s claim 7. Consequently, Sasao also fails to teach or suggest a tool that has a conical end with a vertex of the conical end received in a volume defined by a transition portion so that the vertex avoids contact with the sealing surface and with the transition portion, as also recited in Applicant’s claim 7.

Thus, Yuji, Claxton, and Sasao, whether considered individually or together, fail to teach or suggest the combination of features recited in Applicant’s independent claim 7. Accordingly, the rejections of claim 7 should be withdrawn.

Claims 2-4, 6 and 8-10 depend ultimately from independent claim 7, are therefore also allowable for at least the same reasons as claim 7, as well for reciting additional features that further distinguish Applicant’s invention over the applied prior art.

Second, the Office Action alleges that it would have been obvious for one of ordinary skill in the art to use “a grinding tool having a conical end with a vertex, in light of the teachings of Sasao et al.” Applicant disagrees. It is respectfully submitted that there is no teaching or suggestion in Sasao of a tool having a conical end with a vertex, and that the configuration of the

tool alleged in the Office Action is based solely on Applicant's specification. Moreover, it is respectfully submitted that there is no teaching or suggestion in Sasao, or in any of the other applied prior art references, of a transition portion that provides a volume receiving the vertex of the tool so that the vertex avoids contact with the sealing surface and with the transition portion. Such a relationship of the vertex with respect to the sealing surface and transition portion is described solely in Applicant's specification.

The Office Action acknowledges that "the tool of Sasao et al. has a truncated cone surface rather than [a] cone having a 'sharp point.'" However, the Office Action goes on to allege that "[t]he portion that may extend into the region of the transition volume does not engage with any surface of the fuel injector and therefore, serves no precise function." Again, there is no basis, other than Applicant's specification, to teach or suggest a tool including a portion that extends into, but does not engage, a transition volume.

Moreover, it is respectfully submitted that, absent Applicant's specification, there is no other rationale that teaches or suggests modifying Sasao's burnishing tool 17, which has a truncated cone surface, to have a sharp point that would be received in a transition volume so that the sharp point avoids contact with the sealing surface and with the transition portion. There is simply no recognition of the problems that have been identified and overcome by Applicant's invention, e.g., that the velocity of a grinding tool at the edge of a small orifice fuel injector is insufficient to provide a selected sealing surface finish. See Applicants specification at page 2, lines 1-3, and page 9, lines 10-14.

CONCLUSION

In view of the foregoing amendments and remarks, Applicant respectfully requests the reconsideration of this application and allowance of the pending claims 2-4 and 6-10. Applicant respectfully invites the Examiner to contact the undersigned at (202) 739-5743 if there are any outstanding issues that can be resolved via a telephone conference.

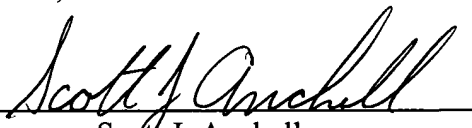
Entry of this Request for Reconsideration is respectfully submitted to be proper inasmuch as no new matter has been added, no new issues have been raised, and no claims have been added.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages are captioned "**VERSION WITH MARKINGS TO SHOW CHANGES MADE.**"

EXCEPT for issue fees payable under 37 C.F.R. §1.18, the Commissioner is hereby authorized by this paper to charge any additional fees during the entire pendency of this application including fees due under 37 C.F.R. §§1.16 and 1.17 which may be required, including any required extension of time fees, or credit any overpayment to Deposit Account No. 50-0310. This paragraph is intended to be a **CONSTRUCTIVE PETITION FOR EXTENSION OF TIME** in accordance with 37 C.F.R. §1.136(a)(3).

Respectfully submitted,
MORGAN, LEWIS & BOCKIUS LLP

Date: 19 December 2001

By: 
Scott J. Anchell
Reg. No. 35,035

Customer No. 009629
MORGAN, LEWIS & BOCKIUS LLP
1800 M Street, N.W.
Washington, D.C. 20036
(202) 467-7000

VERSION SHOWING MARKED UP CHANGES

IN THE CLAIMS:

Claims 7 has been amended as follows:

7. (Twice amended) A method of forming a fuel injector seat, the seat having an upstream face, a downstream face, and a passage extending along an axis between the upstream face and the downstream face, the method comprising:

forming within the passage an orifice portion proximate the downstream face and having a first transverse cross-sectional area relative to the axis;

forming within the passage a sealing portion proximate the upstream face and having a second transverse cross-sectional area relative to the axis that decreases at a first rate in a downstream direction from a first area to a second area;

determining a ratio of the first transverse cross-sectional area over the first area; and

forming within the passage a transition portion when the ratio of the first transverse cross-sectional area over the first area exceeds a predetermined value, the transition portion being interposed between the orifice portion and the sealing portion and having a third transverse cross-sectional area relative to the axis that decreases at a second rate in the downstream direction from the second area to the first transverse cross-sectional area, wherein the forming of the sealing portion includes grinding with a tool that has a conical end with a vertex of the conical end disposed in the transition portion to provide a select finish on the sealing portion, the transition portion provides a volume receiving the vertex of the tool so that the vertex avoids contact with the sealing surface and with the transition portion, the vertex being proximate to the axis of rotation.